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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,125	03/08/2005	Jill MacDonald Boyce	PU020419	3161

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EXAMINER	
LEWIS, JONATHAN V	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,125	BOYCE ET AL.	
	Examiner	Art Unit	
	Jonathan Lewis	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 10-13, 16, 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Aharoni et al. (US Pat. No. 6,014,694).

Regarding claim 1, Aharoni et al. teaches a method for transmitting a plurality of pre-coded programs having different bit rates across a fixed bandwidth channel (Abstract), comprising the steps of: generating at least two different bit rate representations of each program (col. 3, lines 9-17 disclose the generation of a plurality of bit rate representations); providing control information at each of a plurality of successive time windows T for each representation of each program (col. 2, lines 29-43 discloses the control information provided for multiple time windows), the control information for each successive window indicating a bit rate and quality measure for a representation of a corresponding program (Fig. 10 discloses the bit rate for a time period, and the quality is indicated by the frame rate disclosed in col. 7, lines 1-4); and during each time window T, selecting a representation for each program such to maximize the quality of the selected representations while not exceeding a total available capacity for the channel (col. 6, line 61 – col. 7, line 6).

Regarding claim 2, Aharoni et al. teaches the method according to claim 1 wherein the step of generating at least two different bit rates representation further comprises the step of generating for each program a lowest bit rate representation having a peak bit rate not greater than C/P where C is the total channel capacity in time T and P is the total number of programs (Fig. 5 shows the generation of 5 different bit rates; Fig. 10 shows the bit rate not exceeding the capacity for the program in time).

Regarding claim 4, Aharoni et al. teaches the method according to claim 1 wherein the selecting step further comprises the step of selecting a representation for each program which meets the constraint $(p=0:p-1) \sum r[p,n[p]] \leq C$ for all time windows (Fig. 10 shows the bit rate not exceeding the capacity for the program in time) wherein: C is the total channel capacity available in time frame T (Fig. 10, Network Channel bandwidth); P is the total number of programs (Fig. 8, P=1 video stream); $p \varepsilon (0, P-1)$, is the index of a particular program (Fig. 8, GOP); N[p] is the total number of representations of program p (Fig. 5, p = 5); $n[p] \varepsilon (0, N[p]-l)$ is the index of a particular representation of program p (Fig. 8, level 2); and r[p, x] is the bit rate of representation x of program p during T (Fig. 10, Receive Rate).

Regarding claim 5, Aharoni et al. teaches the method according to claim 4 further comprising the step of choosing each program's representation $n[p] \varepsilon (0, N[P]-1)$ to maximize the quality of the program p that had the minimum quality (col. 3, lines 9-28).

Regarding claim 6, Aharoni et al. teaches the method according to claim 5 further comprising the steps of: (a) sorting the quality information for with the bit rate and quality measure monotonically increasing with an index value (Fig. 5, levels 1-5 of

quality); (b) storing each bit rate increment (delta) and quality value for each index value (col. 7, lines 7-10); (c) beginning with a lowest index value, computing total capacity S for program representations selected thus far for such index value (col. 12, lines 10-19); (d) selecting a program representation at a lowest quality measure (col. 10, lines 22-33); (e) checking whether the bit rate increment of the selected program at the lowest quality, when added to the representations selected thus far, exceeds total channel capacity (col. 4, lines 8-34), and if not (f) incrementing the index value (col. 4, lines 31-34); and (g) repeating steps (c)-(f) (Fig. 12/2).

Regarding claim 11, Aharoni et al. teaches the system according to claim 10 wherein the generating means and control information providing means collectively comprise: a plurality of multirate stream generators, each associated with a corresponding one of the plurality of pre-coded programs (Fig. 1, 14 shows one stream generator; Fig. 15, 212 shows another multirate stream generator).

Regarding claim 12, Aharoni et al. teaches the system according to claim 10 wherein the generating means and control information providing means collectively comprise: a multirate video encoder for encoding at least two bit rate representations of each pre-coded program (col. 6, lines 46-50).

Regarding claim 13, Aharoni et al. teaches the system according to claim 10 wherein the generating means and control information providing means collectively comprise: a multirate video encoder for encoding at least two bit rate representations of each pre-coded program (col. 6, lines 46-50); and a plurality of transport packetizers,

each serving to packetize the bit rate presentations for each pre-coded program (Fig. 9, 102).

System claims 10, 16, 18-19 are rejected for the same reasons as discussed in the corresponding method claims above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aharoni et al. (US Pat. No. 6,014,694) in view of Zhang et al. (US PG Pub. No. 2002/0010938).

Regarding claim 3, Aharoni et al. teaches all the claim limitations as stated above, except the step of providing the control information further comprises the step of establishing the peak signal-to-noise ratio (PSNR) as the quality measure embodied in the control information.

However, Zhang et al. teaches the step of providing the control information further comprises the step of establishing the peak signal-to-noise ratio (PSNR) as the quality measure embodied in the control information (page 7, 0104).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to establish the peak signal-to-noise ratio as the quality measure in the control information, in order to have a base level, with which

comparisons can be made while making determinations about the quality adaptation of a streaming video, to optimize the best quality available in consideration to the amount of bandwidth available in a network.

System claim 17 is rejected for the same reasons as stated above in the corresponding method claim.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aharoni et al. (US Pat. No. 6,014,694) in view of applicant's admitted prior art Rao (US Pat. No. 5,940,738).

Regarding claim 7, Aharoni et al. teaches all the claim limitations as stated above, except method according to claim 1 wherein the selecting step further comprises the step of selecting the representation for each program such to maximize a sum of individual program qualities by solving (p=0:p-1) max $\sum$ q[p,n[p]]; subject to (p=0:p-1) $\sum$ r[p,n[p]] $\leq$ C wherein, C is the total channel capacity available in time frame T; P is the total number of programs; p ε (0, P-1), is the index of a particular program; N[p] is the total number of representations of program p; n[p] ε (0, N[p]-l) is the index of a particular representation of program p; and r[p, x] is the bit rate of representation x of program p during T; and q[p, x] is the quality of representation x of program p during T.

However, Rao teaches method according to claim 1 wherein the selecting step further comprises the step of selecting the representation for each program such to maximize a sum of individual program qualities by solving (p=0:p-1) max $\sum$ q[p,n[p]]; subject to (p=0:p-1) $\sum$ r[p,n[p]] $\leq$ C wherein, C is the total channel capacity available in time frame T; P is the total number of programs; p ε (0, P-1), is the index of a particular

program; N[p] is the total number of representations of program p; n[p] ε (0, N[p]-l) is the index of a particular representation of program p; and r[p, x] is the bit rate of representation x of program p during T; and q[p, x] is the quality of representation x of program p during T (Fig. 13A and B show the request and streaming of multiple programs based on sum of the program qualities).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to select which stream to send to a customer based on the sum of the individual programs, in order to preserve bandwidth by sending the highest possible quality program based on the constraints of the network.

Regarding claim 8, Aharoni et al. teaches all the claim limitations as stated above, except method according to claim 1 wherein the selecting step further comprises the step of selecting the representation for each program such to maximize a product of individual program qualities by solving (p=0:p-1) max Π q[p,n[p]]; subject to (p=0:p-1) ∑ r[p,n[p]] ≤ C wherein, C is the total channel capacity available in time frame T; P is the total number of programs; p ε (0, P-1), is the index of a particular program; N[p] is the total number of representations of program p; n[p] ε (0, N[p]-l) is the index of a particular representation of program p; and r[p, x] is the bit rate of representation x of program p during T; and q[p, x] is the quality of representation x of program p during T.

However, Rao teaches method according to claim 1 wherein the selecting step further comprises the step of selecting the representation for each program such to maximize a product of individual program qualities by solving (p=0:p-1) max Π q[p,n[p]]; subject to (p=0:p-1) ∑ r[p,n[p]] ≤ C wherein, C is the total channel capacity available in

time frame T; P is the total number of programs; p ε (0, P-1), is the index of a particular program; N[p] is the total number of representations of program p; n[p] ε (0, N[p]-l) is the index of a particular representation of program p; and r[p, x] is the bit rate of representation x of program p during T; and q[p, x] is the quality of representation x of program p during T (Fig. 13A and B show the request and streaming of multiple programs based on sum of the program qualities)..

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to select which stream to send to a customer based on the strict subset of the individual programs, in order to preserve bandwidth by sending the highest possible quality program based on the constraints of the network.

Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aharoni et al. (US Pat. No. 6,014,694) in view of Laksono et al. (US PG Pub. No. 2003/0046704).

Regarding claim 9, Aharoni et al. teaches all the claim limitations as stated above, except the step of applying a weighted average to provide different classes of service for different viewers.

However, Laksono et al. teaches the step of applying a weighted average to provide different classes of service for different viewers (Fig. 5).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to apply a weight to provide different classes of service, in order to vary the rates of video-on-demand based on congestion of the network, which will maximize profitability of video service providers.

Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aharoni et al. (US Pat. No. 6,014,694) in view of Krishnamurthy et al. (US Pat. No. 6,665,872).

Regarding claim 14, Aharoni et al. teaches all the claim limitations as stated above, except the selecting means includes a static multiplexer.

However, Krishnamurthy et al. teaches the selecting means includes a static multiplexer (Fig. 1, 114).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to select with a static multiplexer, in order to improve the efficiency of bandwidth usage.

Regarding claim 15, Aharoni et al. teaches all the claim limitations as stated above, except the selecting means comprises: a static multiplexer; and a transport packetizer for packetizing the selecting representation.

However, Krishnamurthy et al. teaches the selecting means comprises: a static multiplexer (Fig. 1, 114); and a transport packetizer for packetizing the selecting representation (col. 6, lines 17-31).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to use, to select with a static multiplexer and packetize the selection, in order to improve the efficiency of bandwidth usage.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Lyles et al. US Pat. No. 5,917,822

b. Adams et al. US Pat. No. 6,124,878

c. Seaholtz et al. US Pat. No. 6,246,695

d. Song et al. US PG Pub. No. 2002/0157103

e. Lin et al. US Pat. No. 6,738,980

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Lewis whose telephone number is (571) 270-3233. The examiner can normally be reached on Mon - Fri 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Pendleton can be reached on (571) 272-7527. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BRIAN PENDLETON
SUPERVISORY PATENT EXAMINER